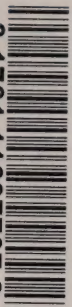


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# NATIONAL ENERGY BOARD REASONS FOR DECISION

In the Matter of an Application under  
the National Energy Board Act

of

Saskatchewan Power Corporation

April 1979



NATIONAL ENERGY BOARD

In the Matter of an Application Under

the National Energy Board Act

*Canada*

SASKATCHEWAN POWER CORPORATION

April 1979

The Board, having received and considered the report of the Hearing Officer, Mr. Robert A. Stead, made pursuant to the provisions of the Act, and on the basis of that report, hereby adopts that report as the statement of its findings and its decision on the application.

NATIONAL ENERGY BOARD

REASONS FOR DECISION

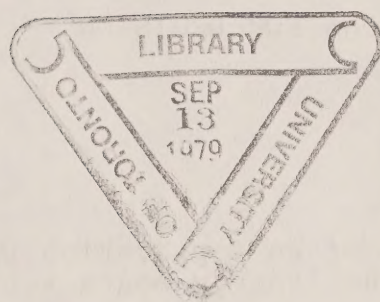
In the Matter of an Application Under  
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of

SASKATCHEWAN POWER CORPORATION

April 1979

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séparément dans les  
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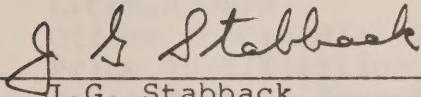
NATIONAL ENERGY BOARD

In the Matter of an Application Under  
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of

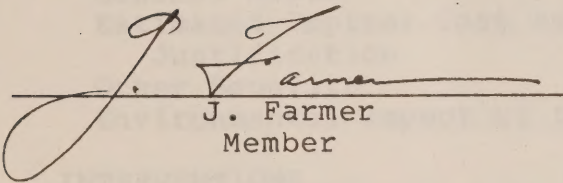
SASKATCHEWAN POWER CORPORATION

April 1979

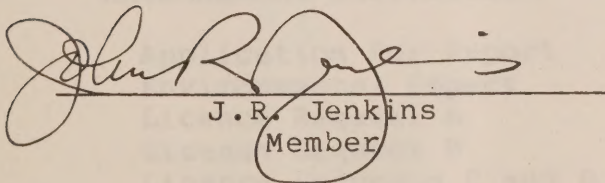
The Board, having received and considered the report of the Presiding Member, Mr. Robert A. Stead, made pursuant to Section 14 of the Act, and on the basis of that report having satisfied itself with regard to all considerations that appear to it to be relevant, hereby adopts that report as the statement of its findings and its decision on the application.



J.G. Stabback  
Chairman



J. Farmer  
Member



J.R. Jenkins  
Member

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ABBREVIATIONS USED IN THE REPORTFor Units of Measurement

GW.h	:	gigawatt-hour
km	:	kilometre
kV	:	kilovolt
kW.h	:	kilowatt-hour
m	:	metre
MCM	:	thousands of circular mils
mm	:	millimetre
MW	:	megawatt

For Names

Act	:	National Energy Board Act
Applicant	:	Saskatchewan Power Corporation
Basin Electric	:	Basin Electric Power Cooperative
Board	:	National Energy Board
CSA	:	Canadian Standards Association
MAPP	:	Mid-Continent Area Power Pool
Manitoba Hydro	:	The Manitoba Hydro-Electric Board
NEB	:	National Energy Board
Saskatchewan Power	:	Saskatchewan Power Corporation
SPC	:	Saskatchewan Power Corporation
U.S.	:	United States of America

Miscellaneous Terms

ACSR	:	aluminum conductor, steel reinforced
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NATIONAL ENERGY BOARD

IN THE MATTER OF an application by Saskatchewan Power Corporation for:

- I. a certificate of public convenience and necessity under Part III of the National Energy Board Act in respect of the construction and operation of an international power line; and
- II. licences under Part VI of the National Energy Board Act for the exportation of power.

(File 1940-4/S7-1)

HEARD at Regina, Saskatchewan on 20 and 21 February 1979.

BEFORE:

Robert A. Stead

as Presiding Member duly authorized by the Board for that purpose in accordance with Section 14 of the National Energy Board Act.

APPEARANCES:

Barbara Tomkins

Saskatchewan Power Corporation

Adele Bilinsky

Manitoba Hydro

Edward Zaleski

F.H. Lamar, Q.C.

National Energy Board

Sandra Fraser

BACKGROUND

The Applicant, Saskatchewan Power Corporation (SPC), is a Crown Corporation which was established in 1950 for the purpose of production and distribution of electricity and natural gas in Saskatchewan. It and its subsidiary, North-Sask Electric Limited which serves isolated northern communities, supply electricity throughout the settled areas of the province. Saskatchewan Power's total installed capacity at the end of 1978 was 1932 MW of which the bulk was coal-fired. The highest transmission voltage in Saskatchewan is 230 kV.

At present the Applicant does not have any international power lines nor does it make any exports of electricity. SPC and Manitoba Hydro are interconnected by two 230 kV lines with a third of the same voltage to be placed in service during 1979. Saskatchewan Power is not interconnected with utilities in Alberta but consideration is being given to establishing such an interconnection during the 1980's.

Appendix 1 is a map showing the major generating stations and transmission facilities of Saskatchewan Power.

## THE APPLICATION

The application, dated 8 August 1978, is in two parts, Part 1 being for a certificate of public convenience and necessity for a 230 kV power line and Part 2 being for four licences to export firm and interruptible power and energy.

### Certificate

The proposed 230 kV line would have a length in Canada of 15.2 kilometres and would run from the Applicant's Boundary Dam switching station to a point on the international boundary southwest of Estevan, Saskatchewan. The United States portion of the line would be constructed and owned by Basin Electric Power Cooperative and would run south from the international boundary 72 km to Tioga, North Dakota and then east another 145 km to Logan substation near Minot, North Dakota. Appendix 2 is a map showing the route of the proposed interconnection and Appendix 3 is a map of the Canadian portion.

### Licences

Part 2 of the application requests the four export licences outlined below:

(A) A licence to export to Basin Electric 100 megawatts of firm power and a maximum of 438 GW.h per year of energy from May through October of each year from 1981 through 1985.

(B) A licence to export to Basin Electric 100 megawatts of firm power and a maximum of 438 GW.h per year from May to October of each year from 1986 through 2000.

(C) A licence to export interruptible energy up to a maximum of 876 GW.h per year during the period 1 May 1981 to 30 April 2001.

(D) A licence to export short-term firm power and energy up to a maximum of 876 GW.h per year, less the amount exported under Request C, during the period 1 May 1981 to 30 April 2001.

THE INTERCONNECTION AND TRANSACTION AGREEMENT

The Interconnection and Transaction Agreement of 13 April 1978, as amended, between Saskatchewan Power Corporation and Basin Electric Power Cooperative specifies that in order to take advantage of improved service reliability, conservation of natural resources and capital, greater economy of operation, and coordinated planning and operation, the parties will establish a 230 kV interconnection to be in service by May 1981. Each party would bear the cost incurred in its own country.

Article 6.01 of the agreement contemplates the sale by SPC of 100 MW of peaking capacity during each summer season (1 May to 31 October) of each year from 1981 through 1985. Basin Electric would return all energy (but not capacity) so delivered by the following 1 May except as otherwise agreed. SPC would be paid the effective Mid-Continent Area Power Pool (MAPP) rate for the peaking power. The MAPP rates are currently \$2000 (U.S.) per MW per month for capacity and the greater of 8 mills (U.S.) per kW.h or 110 per cent of the supplier's incremental cost for energy.

Article 6.02 contemplates the supply by SPC of 100 MW of peaking capacity during each summer season from 1986 through 2000. Basin Electric would in turn provide a similar supply during the winter seasons. There would be no charge associated with the capacity exchange but unequal energy exchanges would be paid for at the effective MAPP rate.

Attached to the Interconnection and Transaction Agreement are a number of service schedules to cover a variety of inter-utility sales and exchanges. Licence Requests C and D would authorize interruptible and short-term firm exports to be made according to the applicable service schedule . The schedules are summarized below:

<u>Schedule</u>	<u>Class</u>	<u>Description</u>	<u>Rates</u> (\$U.S.)
A	Participation Power	Power from a dedicated generating unit for not less than six months.	Negotiated
B	Seasonal Participation Power	Participation power supplied for six months commencing either 1 May or 1 November.	\$4,200/MW/month plus the greater of 8.0 mills/kW.h or the average production cost from the dedicated unit.
C	Emergency and Scheduled Outage Energy	An "emergency" outage becomes "scheduled" once it has lasted six hours.	For emergency energy the greater of 17.5 mills/kW.h or 110% of incremental. For

<u>Schedule</u>	<u>Class</u>	<u>Description</u>	<u>Rates</u>
			scheduled outage energy the greater of 8 mills/kW.h or 110% of incre- mental or 110% of average cost from unit out of service.
D	Operating Reserve	Supply of spinning reserve by one party to another.	The greater of 110% of incremental or split-savings. A flat rate may be negotiated.
E	Economy Energy	Energy purchased to effect savings when receiving party has adequate capacity to meet its needs.	Split-savings
F	Tertiary Energy	Transactions not otherwise covered in schedules.	Negotiated

<u>Schedule</u>	<u>Class</u>	<u>Description</u>	<u>Rates</u>
G	Operational Control Energy	Energy sold in order to improve operation of sel- ler's system.	90% of decre- mental
H	Peaking Power	Sold for six con- secutive months commencing either 1 May or 1 November at low capacity factor (supplier guarantees at least 20% availability).	\$2,000/MW/month plus the greater of 8 mills/kW.h or 110% of incremental. Energy may be returned instead of sold.
I	Short-Term Firm	Sold for at least seven consecutive days.	\$60/MW/day plus the greater of 8 mills/kW.h or 110% of incre- mental.

Rates will be kept in line with MAPP rates for similar transactions.

THE EVIDENCE: EXPORT OF POWER AND ENERGY

The Saskatchewan Load

At the end of 1978 Saskatchewan Power was supplying electricity to 337,872 customers, an increase of 10,549 from the previous year. Consumption during the year was about 7330 GW.h, up 5.3 per cent from the previous year. The peak load recorded during the year was 1575 MW, up 3.5 per cent from the peak during the previous year. The major industries served by SPC are the potash industry, oil fields and pipeline pumping.

Load Forecast

The application includes Saskatchewan Power's load forecast to the year 2001. Energy requirements are forecast in detail by customer type for the first 10 years and afterwards are projected in total only. Customer types considered in the detailed forecast include residential, farm, commercial, bulk sales and industrial.

Residential and farm sales are based on a forecast of the number of customers and the annual use per customer with consideration given to population forecasts, the number of households, rural/urban customer mix, and appliance saturation levels. Commercial sales are forecast by extrapolating the

existing correlation between commercial and residential sales. Bulk sales consist mainly of sales to Saskatoon which provided its own forecast. Sales to smaller bulk customers are trended. Industrial sales are forecast after consultation with customers about their expansion plans. As well, government and industrial forecasts of mining and manufacturing are considered as are historical trends in energy per unit of output. An allowance for development of new industry is also included. Finally, an estimate of the system losses is added to the forecast.

The peak demand forecast is calculated from the energy forecast by applying the estimated load factor. Load factor is estimated by extrapolating historical trends, which are modified according to pertinent influencing factors. As a cross-check, the historical trend in peak demand is extrapolated and compared with the calculated values.

The forecast for the year 2000/01 arrived at by this method is a peak demand of 3320 MW and an energy requirement of 18,435 GW.h. Regarding forecast accuracy, a witness for the Applicant testified that since 1965, the average one-year forecast has turned out to be about three per cent higher than the actual load. The equivalent figure for forecasts five years ahead has been eight per cent high.

### Generating Capacity Additions

The generating capacity of the integrated Saskatchewan system at the end of 1978 was approximately 1932 MW of which 467 MW was hydroelectric, 1350 MW was coal-fired steam and 115 MW was internal combustion. In 1981, Saskatchewan Power will acquire the 100 MW Island Falls hydroelectric generating station from the Churchill River Power Company. At present this plant is supplying the load at Flin Flon, Manitoba but the load will be taken over by Manitoba Hydro when the plant is added to the SPC system. After this Saskatchewan Power will build either the Nipawin hydroelectric plant at Nipawin or a second unit at the Poplar River coal-fired plant near Coronach. The evidence indicates that either could be in service by 1982 and that both will likely be constructed by 1985. Further load growth will be met by construction of additional coal-fired and hydroelectric plants as required. Appendix 4 shows the power capabilities of the generating stations on the Saskatchewan system at the time of the annual peak for each year of the proposed export.

The application states that the only new facility required to supply the proposed exports would be the international power line. Additionally, the Applicant pointed out that it would be possible to delay the installation of some facilities required to provide for the growth of load in Saskatchewan as a result of the 100 MW wintertime import portion of the diversity exchange envisaged under Licence Request B.

### System Reserve and Surplus

The Applicant's estimates of generating capacity, demand, desired reserve and surplus for October of each year are summarized in Appendix 5. Although the peak load on the system occurs in the winter, the highest load during the six-month summer period when power would be exported under Licence Requests A and B occurs in October. The application states that the reserve criterion employed by Saskatchewan Power is that the required reserve is the larger of 11 per cent of the net forecast or the size of the largest generating unit. For maintenance, Saskatchewan Power assumes a period of four weeks per year for the large thermal units and two weeks for hydroelectric and small thermal units. While no maintenance is done during the peak-load months of December and January there would normally be some maintenance during October and other summer-period months. This has been factored into Appendix 5.

The Applicant's estimate of annual energy capability, demand and surplus are shown in Appendix 6 for dependable and in Appendix 7 for median stream flow conditions. Appendix 8 is similar to Appendix 6 but shows the dependable estimates for the six-month summer period only. Estimates of flow conditions are based on records going back 55 years for the North and South Saskatchewan Rivers and 43 years for the Churchill River. Dependable flow is calculated according to the lowest streamflows in the historical record.

The evidence shows that under the terms of an agreement by which the third interconnection with Manitoba Hydro is being constructed, SPC is responsible for the cost to be incurred by Manitoba Hydro in constructing its section of the line. This obligation will be fulfilled either by paying Manitoba Hydro an estimated \$2.4 million or by delivering to it approximately 300 GW.h by 30 April 1984. The Applicant indicated that its preference will probably be to deliver the energy. This quantity of energy has not been shown as part of SPC's load in Appendices 6, 7 or 8 because of the uncertainty surrounding the final resolution of the commitment.

#### Basin Electric

The U.S. customer for the proposed exports would be Basin Electric Power Cooperative. Basin Electric has 156 cooperative members and its headquarters are in Bismark, North Dakota. Its service area covers most of North Dakota, South Dakota, Montana and Wyoming, as well as parts of Colorado, Nebraska, Iowa and Minnesota. In 1975 Basin Electric supplied over 4500 GW.h to its 319,000 customers. Its present generating capacity is about 1000 MW including purchases.

Basin Electric is a member of the Mid-Continent Area Power Pool which is an organization of utilities which coordinates the sale of surplus power and energy and assures

reserves of its members throughout 11 upper mid-western states and the Province of Manitoba.

Information supplied with the application indicates that Basin Electric is neither strongly summer-peaking nor strongly winter-peaking but rather tends to have a winter peak followed by an approximately equal summer peak followed in turn by a higher winter peak. Basin Electric's power supply includes the purchase of 288 MW of hydroelectric winter peaking capacity from the U.S. Bureau of Reclamation throughout the proposed licence term. The application states that as a consequence of these two factors and, as Basin Electric adds generating capacity to meet its summer peaks, it will continue to have surplus capacity available in each winter season beyond 2000. Basin Electric's forecast summer/winter diversity in the year 2000 is 260 MW.

#### Licence Term

Article 18 of the agreement between Basin Electric and SPC states that in the event that either party is unable to obtain the necessary approvals for the sale and exchange of peaking power (Licence Requests A and B) the agreement shall be void ab initio. A witness who is employed by Basin Electric stated that a 20-year term is required in order to provide sufficient time to recover the costs of establishing the U.S.

portion of the interconnection. Another witness added that a 20-year term would be advantageous to Saskatchewan Power as it would assure the availability of 100 MW from Basin Electric for purposes of long-range planning. The witness from Basin Electric stated that if a 20-year term were not obtained, he would recommend to his Board of Directors that Article 18 of the agreement be applied.

The witness from Saskatchewan Power stated that a term of less than 20 years with respect to Licence Requests C and D would not void the agreement but could result in economic or other disadvantage to either or both parties. The longer the term, he said, the greater the benefits to Saskatchewan Power Corporation.

#### Offers to Canadian Utilities

Saskatchewan Power sent a letter dated 20 April 1978 to Manitoba Hydro offering the power and energy proposed for export under the same terms and conditions as those on which the exports would be made. Manitoba Hydro replied on 26 May 1978 saying that it was not interested in the power and energy under Request A as long as Saskatchewan Power does not intend to preempt, for export purposes, Manitoba Hydro's similar export of peaking power during the summers of 1984 and 1985.

The letter also said that Manitoba Hydro is not interested in exchanging 100 MW of seasonal capacity with energy up to 20 per cent monthly capacity factor as envisaged under Licence Request B. The letter did, however, accept Saskatchewan Power's undertaking to offer energy associated with the seasonal capacity exports above a 20 per cent monthly capacity factor. The letter also accepted SPC's proposal to offer quantities to be exported under Requests C and D before any export is made. SPC replied to Manitoba Hydro on 14 June 1978 agreeing with the proposals set out in Manitoba Hydro's letter.

On 8 May 1978, Saskatchewan Power wrote to the Alberta Electric Utility Planning Council asking that the offer of export power and energy contained in the letter be transmitted to member utilities. The City of Edmonton, Calgary Power, Alberta Power and The City of Medicine Hat replied that they were not interested in the power or energy proposed for export under Requests A or B but that they might, from time to time, wish to purchase surplus capacity or energy. SPC's letter undertook to offer specific quantities to be exported under Requests C and D before any export is made.

Price Justification

Over a period of years the Board has developed three criteria for judging the appropriateness of export prices. Briefly stated, these are that the export price must recover any costs incurred in Canada, that the export price shall not be less than the price to Canadians for equivalent service, and that the export price should not be materially less than the least cost alternative supply in the export market.

The application includes the following evidence designed to demonstrate that the proposed exports are priced to recover the cost incurred in Canada. The application states that there is no cost incurred in supplying seasonal capacity because the facilities from which it would be supplied were constructed for the purpose of meeting the Canadian load at the time of peak. In return for supplying the capacity under Licence Request A, Saskatchewan Power would receive the MAPP demand charge for peaking power which is currently \$2000 (U.S.) per MW per month. In evaluating revenue from the capacity charge the Applicant assumed escalation of five per cent annually and a 10 per cent interest rate, resulting in a present worth in 1981 of \$5,492,000 under Request A. Under Request B the capacity exported during the summer would be returned during the winter when the Canadian peak occurs. The application states that this would allow Saskatchewan Power to defer for one year generation which would otherwise be constructed in 1998. The present worth of the deferred generation in 1981 dollars would be \$5,270,000.

Testimony showed that it is the parties' intention to balance energy exchanges under Requests A and B on an annual basis. If net energy exports were to occur they would be paid for at the prevailing MAPP rate which would be at least 110 per cent of the incremental cost of generation. Testimony showed that, if the energy were returned, it would normally be done at a time when it would displace generation on the Saskatchewan Power system which was at least as costly as the generation used to export the energy in the first place. A witness testified that while it is possible on any given day that returned energy might displace generation which was less costly than the generation used for export, this would not be the case on average.

Exports of interruptible energy under Licence Request C could be made under Service Schedules C, D, E, F or G. A witness for the Applicant testified that energy would never be sold at a price less than its cost of generation.

Exports of short-term firm which would be made under Licence Request D would come from generation which was installed for the purpose of meeting the Saskatchewan load but which would be idle from time to time and could be used to generate short-term capacity exports. The price set out in Schedule I for short-term firm is \$60 (U.S.) per MW per day for capacity plus the greater of 8 mills (U.S.) per kW.h or 110 per cent of the incremental cost for energy.

In order to demonstrate that the proposed prices are not less than for equivalent service in Canada, the Applicant pointed out that it would offer all power and energy available for export to accessible Canadian markets on terms not less favourable to the buyer than those of the proposed export.

Regarding the least cost alternative, the Applicant supplied two cost benefit analyses which were prepared by Basin Electric. The first analysis extended for five years and the second for twenty years. Each analysis stated that the alternative available to Basin Electric would be purchases of peaking capacity from members of MAPP. The alternative would not be exactly comparable to the purchase from SPC because the energy would be purchased outright from MAPP members at peak prices, whereas energy imported from SPC would be returned to it at off-peak times. This would make the alternative a good deal more costly than the exchange with SPC. However, the analyses also indicate that the exchange with SPC, plus the cost of constructing the interconnection would involve approximately the same total expenditure over time as would the alternative of making purchases from other MAPP members.

#### Environmental Impact of Export

The Applicant stated that the power for export would not require construction of additional sources of generation and that in fact the diversity exchange would allow the construction of additional generating facilities to be delayed in Saskatchewan.

Testimony indicated that exports would normally be generated at the Boundary Dam generating station although the Poplar River or Estevan stations might be used occasionally. All three are lignite-fired. A witness for the Applicant testified that generation with respect to Licence Requests A and B would have no overall impact on air or water quality because there would be no net export of energy. With respect to generation for export under Licence Requests C and D he stated that annual ground level concentrations of sulphur dioxide, oxides of nitrogen and particulates would increase in proportion to increased plant output. He added that even allowing for the maximum possible increase the concentrations of these contaminants would remain within the applicable provincial standards and federal air quality objectives. The maximum one-hour and twenty-four-hour ground level concentrations of these contaminants would be unchanged as a consequence of the export although their frequency of occurrence could increase. The witness also stated the temperature rise in Boundary Dam reservoir resulting from the discharge of cooling water associated with maximum generation for export would not adversely affect organisms in the reservoir.

The Applicant indicated that the Saskatchewan Department of the Environment has the authority to order a facility exceeding pollution standards to shut down, but that it had never been exercised with respect to Saskatchewan Power.

## THE EVIDENCE: INTERNATIONAL POWER LINE

### Design Characteristics

The proposed international power line would consist of a three-phase 230 kV circuit on a 30-metre right-of-way running some 15 km from Boundary Dam switching station to a point on the international boundary southwest of Estevan. Appendices 2 and 3 show the proposed route. The line would be supported by "Gulfport" wood-pole structures, a drawing of which is provided in Appendix 9. The conductors would be 954 MCM ACSR. The minimum conductor to ground clearance would be 7 metres at the rated transfer capacity of 150 MW and a conductor temperature of 50° Celsius. Testimony was given that the line design would meet or exceed the requirements of CSA Standard C22.3 "Overhead Systems and Underground Systems".

### Boundary Dam Switching Station

The Canadian terminal of the international power line would be the existing Boundary Dam switching station which is located adjacent to Boundary Dam generating station. The additional equipment required at the switching station would be a 230 kV phase shifting transformer and associated circuit breakers, disconnects, and protection and control equipment.

### General Route

From Boundary Dam the line would proceed westerly and then turn south skirting the west side of the coal deposits which will be mined to fuel the Boundary Dam generating station. The line would cross Boundary Dam reservoir at a relatively narrow point. An alternative route which was considered by the Applicant would have turned south at the same point and then run to the international boundary along a more easterly route which would have been closer to the coal deposits and crossed the reservoir at a wider point. Both the proposed and alternative routes are shown in Appendix 3. The alternative route was rejected because of the possibility it might interfere with mining the coal deposits and because the reservoir crossing would be more expensive.

Testimony at the hearing shows that the Applicant plans to start construction in October of 1980 and that the construction would take about one month. The in-service date projected in the Interconnection and Transaction Agreement is May 1981 or as soon as possible thereafter.

### Estimated Capital Cost and Economic Justification

The estimated total cost of the international power line facilities would be \$4,952,000. This includes \$672,000 for the transmission line, \$3,999,000 for the terminal equipment, \$178,000 for communication and supervisory control equipment and \$103,000 for protection equipment.

As set out under the heading "Price Justification" in the section dealing with evidence on the export, the revenue from exports under Request A would be \$5,492,000 and the economic benefit from deferring generation as a result of the return of the capacity to be exported under Request B would be \$5,270,000. The Applicant pointed out that the capital cost of \$4,952,000 would be recovered within five years.

A witness testified that if the in-service date of the line were delayed, the economic benefit would be reduced because the duration, and hence the revenue, in respect of Request A would be reduced.

#### Other Benefits

Other benefits associated with the international power line which the Applicant pointed out but did not attempt to quantify in economic terms are the opportunity to sell power and energy surplus to Saskatchewan's needs, opportunity for power and energy purchases when required by Saskatchewan Power, improved security in the Saskatchewan and Manitoba systems and increased transfer capacity from Saskatchewan to Manitoba.

Environmental Impact of the Line

Of the land which would be crossed by the line, nearly half is owned by the Applicant and has been, or will be, mined for coal or used for facilities necessary to Boundary Dam generating station. The remaining land is privately owned by about ten landowners and is utilized for grain production.

The application states that no brush clearing would be required and hence the impact upon wildlife would be limited mainly to disturbances during the construction of the line. Testimony showed that this construction would take place during October of 1980. Witnesses for the Applicant testified that the construction and operation of the line would have little or no effect on erosion or drainage, natural vegetation, fisheries, land use, recreational activities, aesthetics, radio or television reception, transportation or archaeology. A witness further testified that the Boundary Dam generating station is the most significant source of audible noise in the area and it would remain so after construction of the proposed line and extension of the substation facilities. Testimony showed that the levels of radio interference expected from the line would meet or better the requirements of CSA Standard C108.31-1975 "Tolerable Limits and Methods of Measurement of Electromagnetic Interference from Alternating Current High Voltage Power Systems" under fair weather conditions. The witness was unable to provide estimates of radio interference under foul weather conditions.

The application includes an overview report for the proposed line which was submitted to the Environmental Assessment Secretariat of Saskatchewan's Department of the Environment. The Applicant stated that the Department of Environment had approved the routing of the proposed transmission line.

INTERVENTIONS

The following is a brief description of the only intervention received in respect of this application.

Manitoba Hydro

Manitoba Hydro's written intervention supported in principle Saskatchewan Power's application for a certificate and supported the application for licences on the conditions which were indicated in the letters respecting Saskatchewan Power's offer to Manitoba Hydro of the power and energy proposed for export. At the hearing Manitoba Hydro did not cross-examine the Applicant's witnesses nor did it present any evidence. In argument Manitoba Hydro reiterated its position that it supported Saskatchewan Power's application for a certificate and for licences subject to the above conditions. Manitoba Hydro requested that any licence issued by the Board contain the usual provisions requiring the licensee to first offer the power to accessible Canadian systems under the same terms and conditions as the proposed export.

RECOMMENDED DISPOSITION

As Presiding Member, authorized by the Board under Section 14 of the Act, I have given careful consideration to all the evidence and submissions presented to me in respect of this application. My analysis of them leads me to this Recommended Disposition.

Application for Export

Section 83 of the Act requires the Board, in hearing an application for an export licence, to have regard to all considerations that appear to it to be relevant. In particular, the Board is required to satisfy itself that the quantity of power to be exported is surplus to reasonably foreseeable Canadian requirements and that the price to be charged is just and reasonable in relation to the public interest. I have therefore examined the evidence on the basis of these provisions.

Before considering the four individual parts of the export application I shall deal first with one matter that relates to the whole, namely the environmental impact of producing power for export.

## Environmental Impact

The evidence shows that generation for export would take place at Boundary Dam generating station or another of the Applicant's lignite-fired generating stations. No additional generating facility would be constructed to supply the proposed export and, hence, any environmental impact would arise from incremental production at existing generating stations on the Saskatchewan Power system. In fact, the proposed diversity export would allow the Applicant to delay the construction of some generation, thus delaying the associated environmental effects. The proposed export would not increase the maximum rate of gaseous emissions from any of the generating stations although the frequency with which such effects occurred might be increased if there were net exports. While annual ground level concentrations of air-borne contaminants would increase in proportion to the increased generation for export, the applicable provincial standards and federal air quality objectives should not be exceeded even if all the energy proposed for export were generated at one station, namely Boundary Dam. Additionally, the temperature rise in Boundary Dam reservoir resulting from the discharge of cooling water associated with maximum export would not adversely affect organisms in the reservoir. It follows that if generation for export were shared amongst a number of generating stations, the effects in any one locality would be even smaller. I am therefore satisfied that the generation of the energy proposed for export would cause no significant harm to the environment. Moreover, the

fact that the Saskatchewan Department of the Environment has authority to order a reduction in generation is reassuring because it will presumably do so should excessive pollution occur for whatever reason.

#### Licence Request A

Licence Request A is for the sale of 100 megawatts of peaking capacity to Basin Electric for the six-month period from May to October of each year from 1981 to 1985 inclusive. The requested energy limit would be 438 GW.h per year which corresponds to a load factor of 100 per cent over the six-month summer period. The energy associated with the peaking capacity would normally be returned during the following winter.

In assessing the surplus nature of the power proposed for export, it is necessary to consider both capacity and energy. For capacity, Appendix 5 shows that SPC would have considerable capacity surpluses in October of each year even after the proposed export is taken into account. October is shown in Appendix 5 because this is the summer month in which the Applicant's load is the largest. The evidence shows that after taking the proposed 100 MW export into account there would still be surplus capacity in the other summer months as well. In regard to energy, Appendix 8 shows large surpluses during the six summer months of each year, even after the maximum proposed export of 438 GW.h is taken into account. The surpluses are

sufficiently large that SPC would still be able to supply the 300 GW.h commitment to Manitoba Hydro in any one year of the proposed export. The power and associated energy up to a load factor of 20 per cent (87.6 GW.h) has been offered to neighbouring Canadian power systems and declined. SPC has undertaken to offer energy over the 20 per cent load factor before committing it for export. I am satisfied that the proposed export would be surplus to reasonably foreseeable Canadian requirements.

The price for the proposed export would be the MAPP rate for peaking power in effect at the time of the export. The MAPP rates are currently \$2,000 (U.S.) per megawatt per month for capacity and the greater of 8 mills (U.S.) per kW.h or 110 per cent of the incremental generating cost for energy. Since no additional facilities would be constructed to generate the power and energy proposed for export, the capacity charge would be clear profit which would be used to defray the costs associated with the proposed international power line. The evidence shows that the incremental cost of generating the energy associated with this export would be less than six mills per kilowatt-hour. If the energy were sold it would be at a profit. If the energy were returned, it would normally be done at a time when it would displace generation on the Saskatchewan system which was as costly as that used to generate the export in the first place. I am satisfied that the export price would

would recover its appropriate share of the costs incurred in Canada, thus satisfying the Board's first price criterion.(1)

The offering of the power and energy to adjacent Canadian utilities under the same terms and conditions as the proposed export ensures that the export price is not lower than the price for comparable service to Canadians, thus satisfying the Board's second criterion.

The export would be priced at the effective MAPP rate, which would also be the price at which Basin Electric might purchase peaking power from an alternate source. I am satisfied that the export price meets the Board's third test.

I therefore recommend that the Board issue to Saskatchewan Power a licence for the export to Basin Electric of 100 megawatts of firm peaking capacity and a maximum of 438 GW.h of associated energy from 1 May to 31 October of each year from 1981 to 1985. Applicable terms and conditions are set out in Appendix 10.

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(1) See page 16 for a description of the Board's export price criteria.

Licence Request B

Licence Request B is for a diversity exchange of 100 megawatts with Basin Electric to commence in 1986 at the expiry of the licence requested under A. SPC would export 100 megawatts in the six-month summer period from May to October in each year from 1986 to 2000. In return Basin Electric would provide Saskatchewan Power with a similar supply during the six winter months commencing in November 1986 and concluding at the end of April 2001. The requested licence would have an energy export limit of 438 gigawatt-hours per year corresponding to an export at 100 per cent load factor during the six-month summer period. It is the parties' intention to balance energy exchanges on an annual basis as nearly as possible.

Examination of Appendix 5 shows that even after the proposed export is taken into account, SPC will have substantial surplus capacity in October of each year of the proposed export. The evidence shows that this will be true for the other summer months as well. Regarding energy, Appendix 8 shows that large surpluses will remain during the six-month summer period each year, even after the proposed maximum export of 438 gigawatt-hours is taken into account. As with Request A, Saskatchewan has offered the power and energy up to a load factor of 20 per cent to neighbouring Canadian power systems.

The offers were declined. Additionally, the Applicant has undertaken to offer energy over the 20 per cent load factor before committing it for export. I am therefore, satisfied that the quantities proposed for export would be surplus to reasonably foreseeable Canadian requirements.

There would be no price for the capacity component of the proposed export. Instead, Saskatchewan Power would receive in return an equivalent amount of capacity during the winter months. This return would be much more valuable to Saskatchewan Power than the capacity which was originally exported because it would occur during the winter and would therefore be available at times when the loads in Saskatchewan are high. The evidence shows that the wintertime import will substantially improve the reliability of the Saskatchewan system because it will be available to meet unforeseen outages at times of peak load. Additionally the Applicant stated that the import would allow it to defer, by one year, generation which would otherwise have to be constructed in 1998. The value of this deferral, stated in 1981 dollars, was put at \$5.27 million. It is obviously difficult to forecast exactly when the generation could be deferred, but I accept in principle the fact that the import would allow deferral of generation at some point and that the deferral would convey an economic benefit to the Applicant.

Although the parties intend to balance energy exchanges on an annual basis, the licence requested would allow the export of up to 438 GW.h annually. If the energy which was exported were returned during the following winter, it would enable Saskatchewan Power to displace its highest cost generation. The cost of generating the energy exported during the summer months would be quite low by comparison because this is the off-peak period in Saskatchewan. If the energy were not returned it would be paid for by Basin Electric at the prevailing MAPP rate which is currently the greater of 8 mills (U.S.) per kilowatt-hour or 110 per cent of the incremental cost of generation. Such a pricing formula ensures that the seller will recover the costs. Therefore, I am satisfied that the export price would recover its costs incurred in Canada, thus satisfying the Board's first price criterion.

The offering of the power and energy to accessible Canadian utilities under the same terms and conditions as the proposed export ensures that the export price is not lower than the price for comparable service to Canadians, thus satisfying the Board's second price criterion.

The evidence indicates that in the absence of the proposed exports from SPC, Basin Electric would purchase power and energy from other MAPP members in order to meet its load. However, this specific licence request would cover exports made as a part of a diversity exchange, not as a sale. If Basin Electric were to enter into a diversity exchange with a utility other than SPC, it would be under terms and conditions similar to the

proposed exchange with the Applicant. I am satisfied that the proposed export meets the Board's third price test.

One matter which causes me concern regarding this licence request is that because it would not start until 1986 and it would have an unusually long term, namely 15 years, it would not expire until the year 2001. This is a long way into the future. While it is difficult to foresee with precision what may lie that far ahead, I am persuaded by the Applicant's arguments that a long-term licence is desirable in this instance in order to facilitate future system planning in an orderly manner.

Witnesses for the Applicant at the hearing testified that a term of this length would be required in conjunction with the five-year term under Request A in order for Basin Electric to recover the costs of establishing the interconnection. This contention was supported by an exhibit supplied at the hearing which purported to show that it would take approximately 20 years for Basin Electric to fully recover its costs. I have examined this document and find it not entirely convincing. For one thing, it shows that Basin Electric has attributed the entire cost of building a 230 kV line from the international border to Logan substation near Minot, North Dakota to the proposed export. Evidence filed with the application states that in the absence of the proposed supply from SPC, at least some of the U.S. transmission facilities, namely the section between Logan substation and Tioga, would be required to serve Basin Electric's

internal needs by 1985 at the very latest. It is my view that the costs of Basin Electric have been somewhat overstated but, nevertheless, the full 15-year term of Request B will be beneficial to Saskatchewan Power Corporation and, hence, will be in the public interest of Canada.

I therefore recommend that the Board issue to Saskatchewan Power a licence for the export to Basin Electric of 100 megawatts of firm peaking capacity and a maximum of 438 GW.h of associated energy from 1 May to 31 October of each year from 1986 to 2000. Applicable terms and conditions are set out in Appendix 11.

#### Licence Requests C and D

Licence Requests C and D are for licences to allow the export of interruptible energy and of short-term firm power and energy respectively. The combined maximum export would be 876 GW.h per year and the requested term is 20 years from 1 May 1981 to 30 April 2001. Exports under Request C would be made according to the terms and conditions of one or another of Service Schedules C, D, E, F or G which are attached to the Interconnection and Transaction Agreement. Exports under Request D would be according to Service Schedule I. The prices in the service schedules are the same as the rates in the

Mid-Continent Area Power Pool and the agreement provides for the prices to be changed according to changes in the MAPP rates. Similar services would be available to the Applicant from Basin Electric at the same prices.

Regarding surplus, Appendix 6 shows that even under dependable streamflow conditions, Saskatchewan Power expects to have surpluses well in excess of the combined energy limit of 1314 gigawatt-hours for Licences A or B, plus C and D. This, and the fact that energy proposed for export would be offered to accessible Canadian systems before being exported satisfies me that the quantity proposed for export under Request C will be surplus to Canadian requirements.

For Request D, it is necessary also to examine the surplus nature of the capacity to be exported. While it is clear that any power system which has sufficient generation installed to meet its annual peak will have surplus capacity at other times of the year, I am unable to satisfy myself as to exactly what amounts of capacity will be surplus. For this reason I recommend that any licence for short-term firm which is issued under this request contain the usual requirement that the Licensee submit annually for the Board's approval estimates of surplus capacity and energy for the upcoming operating year. This is the Board's normal practice in regard to short-term firm licences. The above provision, and the fact that the power and energy

would be offered to accessible Canadian systems before being committed for export, satisfies me that the quantities to be exported will be surplus to Canadian needs.

I have examined the prices and pricing formulae contained in the service schedules attached to the interconnection agreement and am satisfied that they are just and reasonable in relation to the public interest. With the exception of the classifications of tertiary and operational control energy, the energy prices in the service schedules are all at least 110 per cent of the seller's incremental cost. For short-term firm exports, there would be an additional capacity charge. As sales of operational control energy are designed to improve the operation of the seller's system its price is set at 90 per cent of the purchaser's decremental cost. The price for tertiary energy would be negotiated at the time a sale was being considered. The Applicant stated in testimony that energy would never be exported at less than its cost of generation. I am therefore satisfied that the export prices will recover the costs incurred in Canada.

The fact that the power and energy would be offered to accessible Canadian power systems demonstrates that the export price would be not less than for comparable service to Canadians and the fact that the prices are identical to the MAPP rates

demonstrates that they would be not less than the least expensive alternative in the export market area.

Having dealt with surplus and the Board's three price tests, I now turn to the requested licence term. Terms of 20 years would be longer than that of any licence for short-term firm or interruptible exports issued by the Board to date. Generally, terms of this length may not provide sufficient opportunity to re-examine a Licensee's export policy and practices. Additionally, it has been the Board's experience that over periods shorter than that proposed, conditions often change substantially from those foreseen at the time of the hearing. I therefore look upon the lengthy term proposed by the Applicant with some concern as to its acceptability.

In particular, I am concerned that exports under these licences would take place at rates which will be revised from time to time by the members of MAPP. Saskatchewan Power is not a MAPP member and may have little or no influence over the process of setting the rates. There is no indication that the basis on which MAPP rates are set will be changed radically in the near future but this may not hold true over a 20-year period. I am unable to conclude with certainty that the prices for the proposed exports would continue to be in the Canadian public interest until the year 2001. This concern can be

alleviated if safeguards similar to those frequently used by the Board in other cases are incorporated into any licences which may be issued here. I believe that Saskatchewan Power should be required to seek the prior approval of the Board for any amendments to the Interconnection and Transaction Agreement with Basin Electric. In addition, Saskatchewan Power should be required to seek the Board's approval before putting into effect any change in the prices chargeable for capacity and energy to be exported.

Any export under Licence Request C would be interrupted whenever it was needed to supply Canadian loads. This, and the condition recommended earlier in regard to annual findings of surplus for firm exports under Licence Request D will ensure that export quantities will be surplus to Canadian requirements throughout the terms of the licences.

If all these conditions are applied, the Board could recurringly satisfy itself, in the light of conditions then prevailing, that the proposed exports would be surplus to Canadian requirements and at prices which would be in the public interest. If the above suggested conditions are incorporated into the licences, a term of 20 years is appropriate.

I therefore recommend that the Board issue to Saskatchewan Power a licence for the export of interruptible energy up to a maximum of 876 GW.h per year to run from 1 May 1981 to 30 April 2001. Applicable terms and conditions are set out in Appendix 12.

I also recommend that the Board issue to Saskatchewan Power a licence for the export of short-term firm power and energy for the period 1 May 1981 to 30 April 2001. Applicable terms and conditions are set out in Appendix 13.

#### The International Power Line

Section 44 of the Act requires the Board in considering an application for a certificate to take into account all matters that appear to it to be relevant. In particular the Act states that the Board may have regard to the availability of power for the line, the existence of markets, the economic feasibility of the line, the financing, and any public interest that may be affected by the granting or refusing of the application.

The availability of power and the existence of markets have already been demonstrated. The financing of the line would constitute a minor portion of the Applicant's general financing

program. The engineering and construction of the line would be carried out entirely by Canadians and the supply of materials and equipment for the project will be from Canadian sources to the largest possible extent. The line will be designed in accordance with good engineering practice and modern standards.

Testimony showed that the details of the switching for the international power line at Boundary Dam switching station had not been finalized at the time of the hearing. For the Board's information, I recommend that any certificate which is issued as a result of this application include a condition requiring the Applicant to supply details of the design once it is finalized.

The economic feasibility of the line is demonstrated by the fact that the revenue from exports under Licence Request A will be \$5.5 million whereas the cost of constructing the line will be \$5 million. The additional benefit arising from the deferral of generation will ensure that the project is economically sound.

Other benefits which will arise from the construction and operation of the line but which were not quantified by the Applicant include revenues from exports under Licence Requests C and D, the opportunity for purchases when required by Saskatchewan Power, improved reliability and security to the Saskatchewan and Manitoba systems, and increased system transfer capacity from Saskatchewan to Manitoba.

I am satisfied from the evidence that the environmental impact of the line will be within acceptable limits. Of the land to be crossed by the line one half is owned by the Applicant and will be mined for coal during the life of the Boundary Dam generating station; the other half is utilized for grain production and will not be affected in any substantial way by the line. The fact that no intervenor opposed the construction of the line indicates that there is no major adverse reaction from the landowners who will be affected.

Accordingly, having taken into account all matters that appear to me to be relevant and being satisfied that the line is and will be required by the present and future public convenience and necessity, I recommend that the Board issue to Saskatchewan Power a certificate of public convenience and necessity for the Canadian portion of the 230 kV international power line. Applicable terms and conditions are set out in Appendix 14.

Recapitulation

To recapitulate, I recommend that the Board approve the application for export by granting all four licence requests. I also recommend the issuance of a certificate of public convenience and necessity for the 230 kV international power line.

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I submit this, my report, to the National Energy Board in accordance with Section 14 of the Act. I respectfully recommend that it be adopted as the Board's own findings and decision on the application, as allowed under the said section.



Robert A. Stead  
Presiding Member

Ottawa, Canada  
6 April, 1979



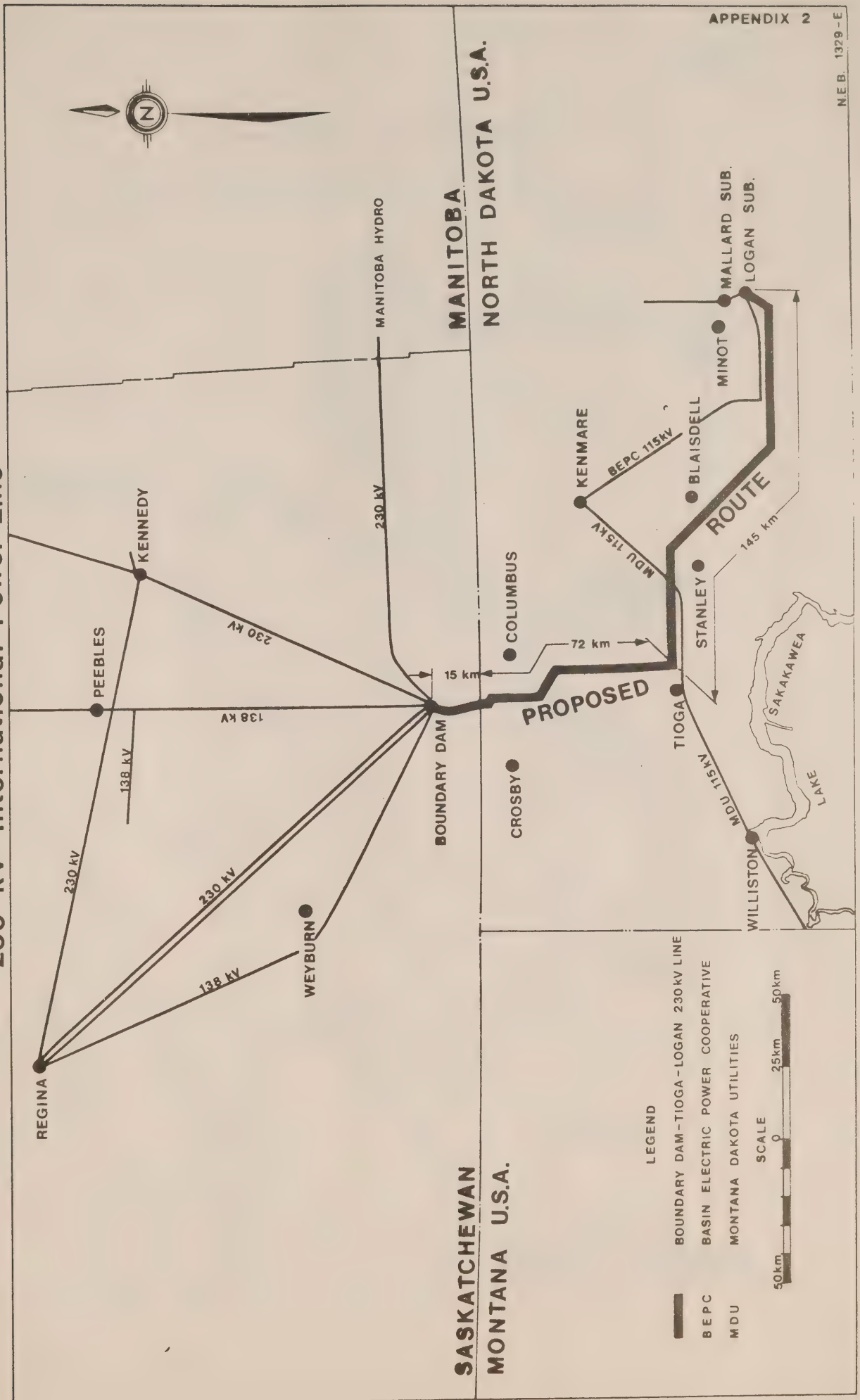
# SASKATCHEWAN POWER CORPORATION

## Major Electric Facilities





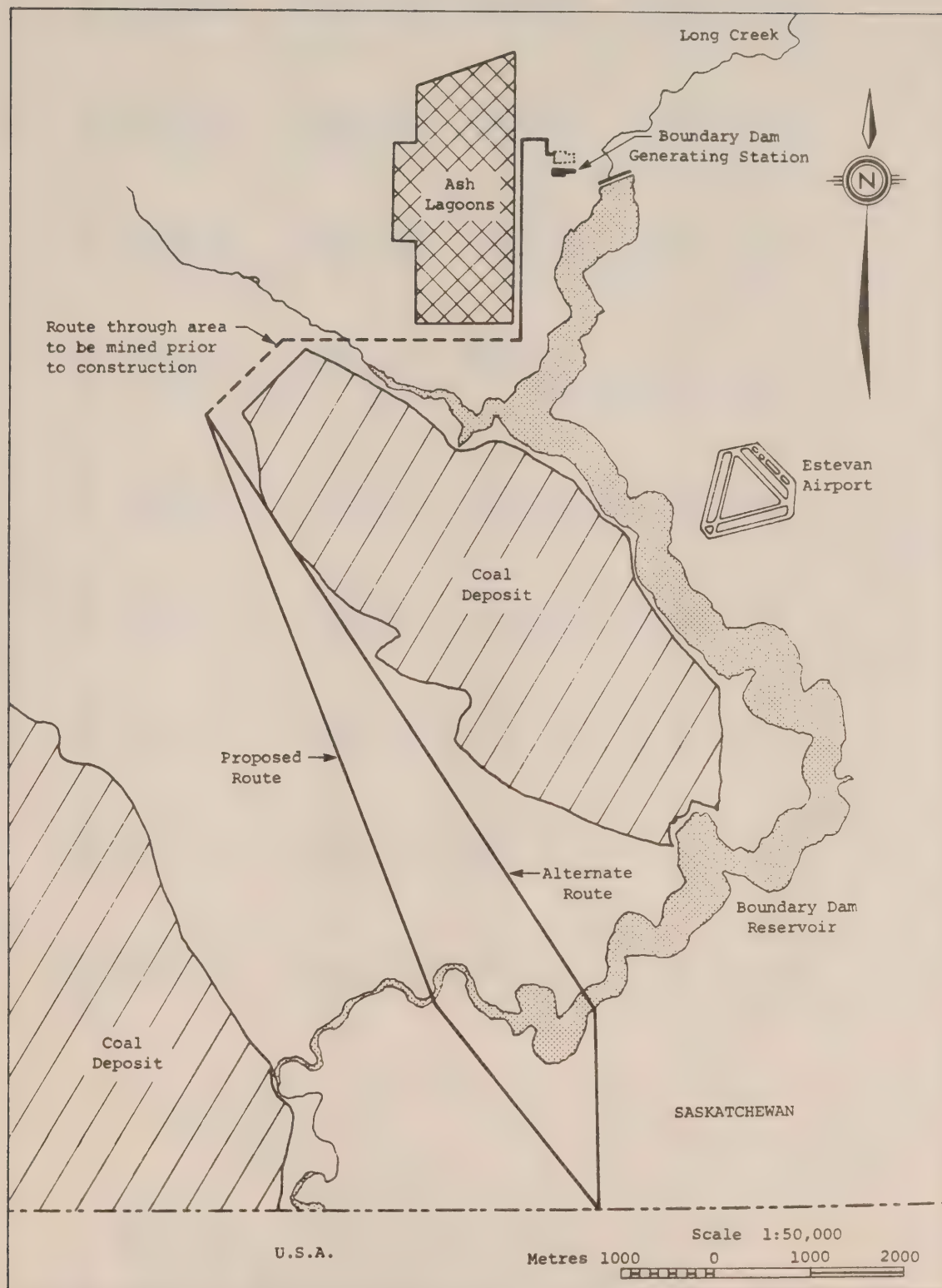
# SASKATCHEWAN POWER CORPORATION Boundary Dam - Tioga - Logan 230 kV International Power Line





SASKATCHEWAN POWER CORPORATION

230 kV International Power Line





SASKATCHEWAN POWER CORPORATION

Power Capabilities  
At the time of the Annual Peak  
(Megawatts)

	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91
<u>HYDRO</u>										
Squaw Rapids	285	285	285	285	285	285	285	285	285	285
Coteau Creek	181	181	181	181	181	181	181	181	181	181
Island Falls	100	100	100	100	100	100	100	100	100	100
New hydro					252	252	252	252	252	252
Total hydro	566	566	566	566	818	818	818	818	818	818
<u>THERMAL</u>										
Boundary Dam A	122	122	122	122	122	122	122	122	122	122
Boundary Dam B	426	426	426	426	426	426	426	426	426	426
Boundary Dam C	280	280	280	280	280	280	280	280	280	280
Estevan	64	64	64	64						
Queen Elizabeth A	124	124	124	124	124	124	124	124		95
Queen Elizabeth B	95	95	95	95	95	95	95	95		
Regina	84									
A.I. Cole	93	93	93	93						
Landis	70	70	70	70	70	70	70	70	70	70
Success	45	45	45	45	45	45	45	45	45	45
Poplar River	280	560	560	560	560	560	560	560	560	560
New thermal								280	280	560
Total thermal	1683	1879	1879	1879	1722	1722	1722	2002	1878	2158
<u>IMPORT</u>										
Basin Electric						100	100	100	100	100
TOTAL	2249	2445	2445	2445	2540	2640	2640	2920	2796	3076

SASKATCHEWAN POWER CORPORATION

Power Capabilities  
At the time of the Annual Peak

(Megawatts)

	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01
<u>HYDRO</u>										
Squaw Rapids	285	285	285	285	285	285	285	285	285	285
Coteau Creek	181	181	181	181	181	181	181	181	181	181
Island Falls	100	100	100	100	100	100	100	100	100	100
New hydro	252	252	537	537	537	537	537	789	789	789
Total hydro	818	818	1103	1103	1103	1103	1103	1355	1355	1355
<u>THERMAL</u>										
Boundary Dam A	122	122	122	122						
Boundary Dam B	426	426	426	426	426	426	426	426	426	426
Boundary Dam C	280	280	280	280	280	280	280	280	280	280
Estevan										
Queen Elizabeth A	95	95	95	95	95	95	95	95	95	95
Queen Elizabeth B										
Regina										
A.L. Cole	70	70	70	70	70	70	70	70	70	70
Landis	45									
Success	560	560	560	560	560	560	560	560	560	560
Poplar River	560	560	560	560	1025	1025	1025	1025	1025	1025
New thermal										
Total thermal	2158	2113	2113	2113	2456	2456	2456	2456	2456	2456
<u>IMPORT</u>										
Basin Electric	100	100	100	100	100	100	100	100	100	100
TOTAL	3076	3031	3316	3316	3659	3659	3659	3911	3911	3911

## SASKATCHEWAN POWER CORPORATION

October<sup>1</sup> Firm Power Capacity, Demand and Surplus  
(Megawatts)

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>
Generating capacity	2058	2196	2253	2253	2348	2348	2395	2533	2528	2669
Demand:										
Saskatchewan	1493	1526	1609	1670	1738	1806	1875	1943	2013	2082
Basin Electric firm	100	100	100	100	100	100	100	100	100	100
Total	1593	1626	1709	1770	1838	1906	1975	2043	2113	2182
Reserve (2)	280	280	280	280	280	280	280	280	280	280
Capacity required	1873	1906	1989	2050	2118	2186	2255	2323	2393	2462
Surplus	185	290	264	203	230	162	140	210	135	207
Generating capacity	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>
2773	2745	2784	2934	3269	3269	3269	3269	3391	3521	3521
Demand:										
Saskatchewan	2149	2221	2290	2360	2429	2499	2568	2638	2707	2777
Basin Electric firm	100	100	100	100	100	100	100	100	100	100
Total	2249	2321	2390	2460	2529	2599	2668	2738	2807	2877
Reserve (2)	281	290	300	309	465	465	465	465	465	465
Capacity required	2530	2611	2690	2769	2994	3064	3133	3203	3272	3342
Surplus	243	134	94	165	275	205	136	188	249	179

1. Summer peak occurs in October.
2. 11% of net forecast or largest unit.



SASKATCHEWAN POWER CORPORATION

Energy: Capability, Load and Surplus  
Dependable River Flows  
(Gigawatt-hours)

	<u>1981/82</u>	<u>1982/83</u>	<u>1983/84</u>	<u>1984/85</u>	<u>1985/86</u>	<u>1986/87</u>	<u>1987/88</u>	<u>1988/89</u>	<u>1989/90</u>	<u>1990/91</u>
<u>Capability:Hydraulic</u>	1 758	1 758	1 758	1 758	2 162	2 439	2 439	2 439	2 439	2 439
Thermal	9 789	10 794	11 729	11 740	11 583	11 277	11 354	12 874	12 498	13 932
Import Basin Electric (1)	88	88	88	88	88	88	88	88	88	88
Total Capability	11 635	12 640	13 575	13 586	13 833	13 804	13 881	15 401	15 025	16 459
<u>Load: Saskatchewan</u>	9 587	9 966	10 520	10 989	11 455	11 920	12 384	12 850	13 314	13 777
Basin Electric (2)	88	88	88	88	88	88	88	88	88	88
Total Load	9 675	10 054	10 608	11 077	11 543	12 008	12 472	12 938	13 402	13 865
Surplus	1 960	2 586	2 967	2 509	2 290	1 796	1 409	2 463	1 623	2 594
	<u>1991/92</u>	<u>1992/93</u>	<u>1993/94</u>	<u>1994/95</u>	<u>1995/96</u>	<u>1996/97</u>	<u>1997/98</u>	<u>1998/99</u>	<u>1999/2000</u>	<u>2000/01</u>
<u>Capability:Hydraulic</u>	2 439	2 439	3 091	3 439	3 439	3 439	3 439	3 843	4 120	4 120
Thermal	14 217	14 538	14 270	13 998	16 096	16 616	16 673	16 673	16 673	16 673
Import Basin Electric (1)	88	88	88	88	88	88	88	88	88	88
Total Capability	16 744	17 065	17 449	17 525	19 623	20 143	20 200	20 604	20 881	20 881
<u>Load: Saskatchewan</u>	14 246	14 709	15 173	15 639	16 106	16 570	17 034	17 499	17 964	18 435
Basin Electric (2)	88	88	88	88	88	88	88	88	88	88
Total Load	14 334	14 797	15 261	15 727	16 194	16 658	17 122	17 587	18 052	18 523
Surplus	2 410	2 268	2 188	1 798	3 429	3 485	3 078	3 017	2 829	2 358

Appendix 6

Notes: (1) Assumes peaking energy to be returned.  
(2) Firm peaking energy associated with 100 MW at 20 per cent load factor for six months per year.



SASKATCHEWAN POWER CORPORATION

Energy: Capability, Load and Surplus  
Median River Flows  
(Gigawatt-hours)

	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91
<u>Capability:</u> Hydraulic	2 675	2 675	2 675	2 675	3 309	3 745	3 745	3 745	3 745	3 745
Thermal	9 789	10 794	11 725	11 736	11 583	11 277	11 354	12 874	12 498	13 932
Import Basin Electric (1)	88	88	88	88	88	88	88	88	88	88
Total Capability	12 552	13 557	14 488	14 499	14 980	15 110	15 187	16 707	16 331	17 765
<u>Load:</u> Saskatchewan	9 587	9 966	10 520	10 989	11 455	11 920	12 384	12 850	13 314	13 777
Basin Electric (2)	88	88	88	88	88	88	88	88	88	88
Total Load	9 675	10 054	10 608	11 077	11 543	12 008	12 472	12 938	13 402	13 865
Surplus	2 877	3 503	3 880	3 422	3 437	3 102	2 715	3 769	2 929	3 900

	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01
<u>Capability:</u> Hydraulic	3 745	3 745	4 964	5 327	5 327	5 327	5 327	5 961	6 397	6 397
Thermal	14 217	14 538	14 270	13 998	16 096	16 616	16 673	16 673	16 673	16 673
Import Basin Electric (1)	88	88	88	88	88	88	88	88	88	88
Total Capability	18 050	18 371	19 322	19 413	21 511	22 031	22 088	22 722	23 158	23 158
<u>Load:</u> Saskatchewan	14 246	14 709	15 173	15 639	16 106	16 570	17 034	17 499	17 964	18 435
Basin Electric (2)	88	88	88	88	88	88	88	88	88	88
Total Load	14 334	14 797	15 261	15 727	16 194	16 658	17 122	17 587	18 052	18 523
Surplus	3 716	3 574	4 061	3 686	5 317	5 373	4 966	5 135	5 106	4 635

Appendix 7

Notes: (1) Assumes peaking energy to be returned.

(2) Firm peaking energy associated with 100 MW at 20 per cent load factor for six months per year.



SASKATCHEWAN POWER CORPORATION

Energy: Capability, Load and Surplus  
Dependable River Flows

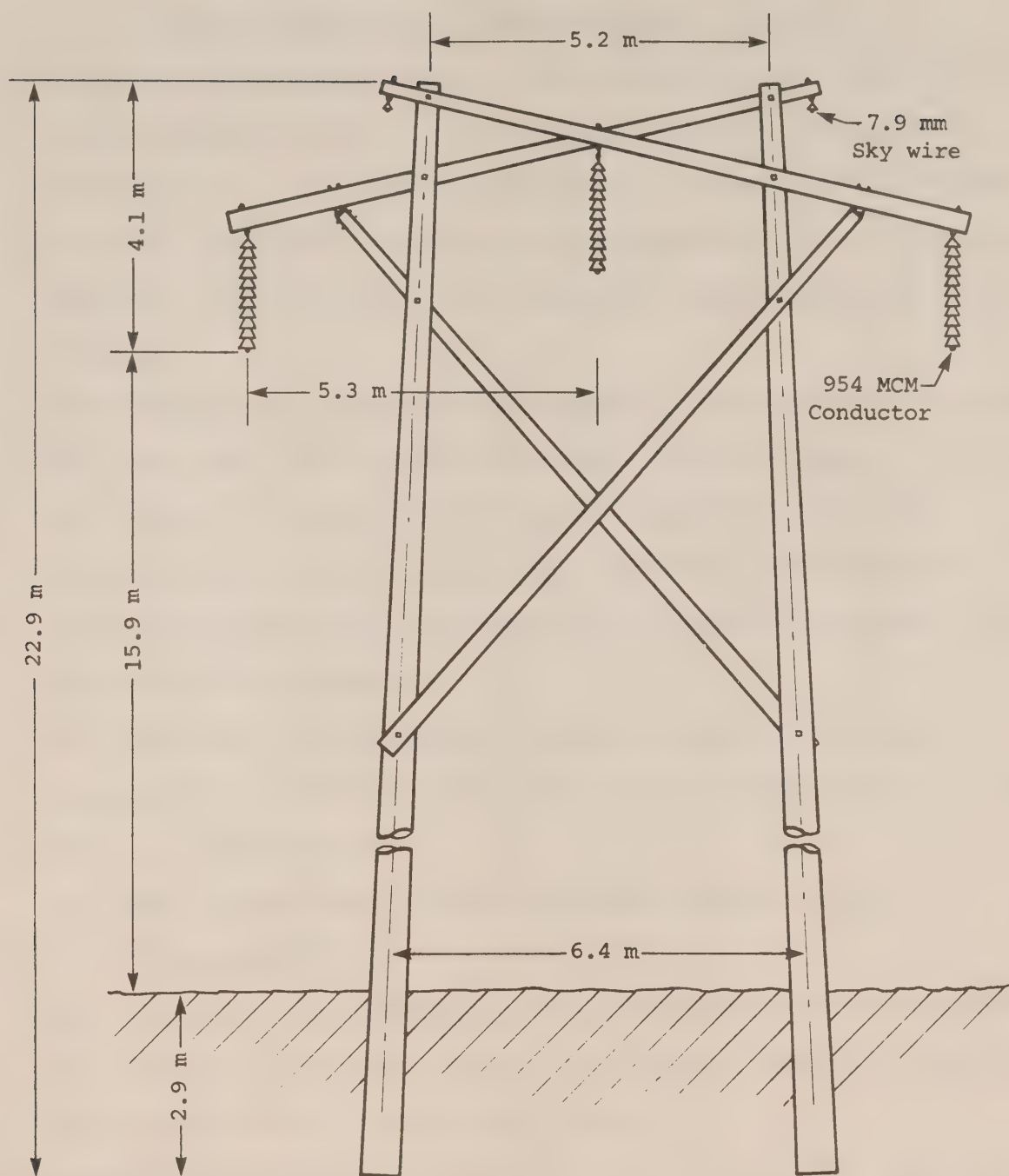
Six Months - May to October

(Gigawatt-hours)

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>
<u>Capability:</u> Hydraulic	687	727	687	677	694	971	971	971	971	971
thermal	4661	4784	5548	5571	5590	5417	5459	6021	6012	6521
Total Capability	5348	5511	6235	6248	6284	6388	6430	6992	6983	7492
<u>Load:</u> Saskatchewan	4298	4425	4712	4936	5152	5368	5583	5799	6013	6227
Basin Electric	438	438	438	438	438	438	438	438	438	438
Total Load	4736	4863	5150	5374	5590	5806	6021	6237	6451	6665
Surplus	612	648	1085	874	694	582	409	755	532	827
<u>Capability:</u> Hydraulic	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>
Thermal	971	971	1055	1403	1403	1403	1403	1450	1727	1727
	6795	6913	6809	6635	7530	7970	8008	8058	7915	7915
Total Capability	7766	7884	7864	8038	8933	9373	9411	9508	9642	9642
<u>Load:</u> Saskatchewan	6445	6657	6870	7085	7301	7515	7728	7943	8157	8372
Basin Electric	438	438	438	438	438	438	438	438	438	438
Total Load	6883	7095	7308	7523	7739	7953	8166	8381	8595	8810
Surplus	883	789	556	515	1194	1420	1245	1127	1047	832



SASKATCHEWAN POWER CORPORATION



TYPICAL 230 kV GULFPORT TANGENT STRUCTURE



TERMS AND CONDITIONS OF EXPORT LICENCE

LICENCE REQUEST A - SUMMER PEAKING CAPACITY

1. The power to be exported under this licence shall be only summer peaking capacity and its associated energy, as described in Article 6.01 of the Interconnection and Transaction Agreement dated the 13th day of April, 1978 as amended on the 19th day of February, 1979, between Basin Electric Power Cooperative and the Licensee.
2. The term of this licence shall commence on the 1st day of May, 1981, and shall end on the 30th day of April, 1986.
3. The classes of inter-utility export transfer authorized hereunder are sale and equichange transfers of firm power.
4. The quantity of capacity that may be exported hereunder shall not exceed 100 megawatts.
5. As a tolerance, the Licensee may export power at a rate momentarily in excess of that set forth in Condition 4 if such excess is caused by
  - (a) electrical short circuit or other uncontrollable circumstances, or
  - (b) inability to control precisely the actual rate of transfer.
6. The quantity of energy that may be exported hereunder shall not exceed 438 GW.h in any calendar year.
7. In each year comprised in the term of this licence, exports of capacity and energy shall be made only during the six-month period commencing on the 1st day of May and ending on the 31st day of October.

8. The price for the peaking capacity and its associated energy exported hereunder shall be not less than the price set forth in Article 6.01 of the Interconnection and Transaction Agreement referred to in Condition 1.
9. The Licensee, before exporting energy hereunder in excess of 20 per cent monthly capacity factor on the 100 MW of peaking capacity
  - (a) shall offer such energy for sale to all economically accessible Canadian electrical utilities at the same price as that of the export, adjusted for any differences in the cost of delivery, and
  - (b) shall export hereunder only that amount of such energy which has not been accepted by those Canadian electrical utilities to which an offer was made in accordance with subcondition (a).
10. The Licensee shall not, without the prior approval of the Board, amend, enter into any agreement in substitution for or in addition to, or terminate the Interconnection and Transaction Agreement referred to in Condition 1.

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11. The Licensee, within 15 days after the end of each month comprised in the term of this licence, shall file with the Board a report in such form and detail as the Board may specify, setting forth for each such month,
- (a) the quantity of capacity and energy exported hereunder,
  - (b) the quantity of energy imported as part of the summer peaking capacity transaction and
  - (c) the prices and resulting revenue or cost.



TERMS AND CONDITIONS OF EXPORT LICENCE

LICENCE REQUEST B - SEASONAL DIVERSITY CAPACITY

1. The power to be exported under this licence shall be only seasonal diversity capacity and its associated energy as described in Article 6.02 of the Interconnection and Transaction Agreement dated the 13th day of April, 1978, as amended on the 19th day of February 1979, between Basin Electric Power Cooperative and the Licensee.
2. The term of this licence shall commence on the 1st day of May, 1986, and shall end on the 30th day of April, 2001.
3. The classes of inter-utility export transfer authorized hereunder are sale and equichange transfers of firm power.
4. The quantity of capacity that may be exported hereunder shall not exceed 100 megawatts.
5. As a tolerance, the Licensee may export power at a rate momentarily in excess of that set forth in Condition 4 if such excess is caused by
  - (a) electrical short circuit or other uncontrollable circumstances or,
  - (b) inability to control precisely the actual rate of transfer.
6. The quantity of energy that may be exported hereunder shall not exceed 438 GW.h in any calendar year.
7. In each year comprised in the term of this licence, exports of capacity and energy shall be made only during the six-month period commencing on the 1st day of May and ending on the 31st day of October.

8. Exports of seasonal diversity capacity hereunder shall only be made on the condition that the power and energy so exported shall be returned to the Licensee to the extent that it is needed to meet the requirements of Saskatchewan Power or any other economically accessible Canadian electrical utility.
9. Where the quantity of capacity and energy returnable under the provisions of Condition 8 exceeds the Licensee's requirements, the Licensee shall offer to sell that portion of the available capacity and energy which is in excess of its requirements to economically accessible Canadian electrical utilities, and shall take all reasonable steps consistent with the security of its power system to ensure delivery of that portion of the excess capacity and energy to those Canadian electrical utilities which have accepted it.
10. The price to be charged by the Licensee for energy exported hereunder shall be no less than the price set forth in Article 6.02 of the Interconnection and Transaction Agreement referred to in Condition 1.
11. The Licensee, before exporting energy hereunder in excess of 20 per cent monthly capacity factor on the 100 MW of seasonal diversity capacity

- (a) shall offer such energy for sale to all economically accessible Canadian electrical utilities at the same price as that of the export, adjusted for any difference in the cost of delivery, and
  - (b) shall export hereunder only that amount of such energy which has not been accepted by those Canadian electrical utilities to which an offer was made in accordance with subcondition (a).
- 12. The Licensee shall not, without the prior approval of the Board, amend, enter into any agreement in substitution for, or in addition to, or terminate, the Interconnection and Transaction Agreement referred to in Condition 1.
- 13. The Licensee, within 15 days after the end of each month comprised in the term of this licence, shall file with the Board a report in such form and detail as the Board may specify, setting forth for each such month
  - (a) the quantities of capacity and energy exported hereunder,
  - (b) the quantities of capacity and energy imported as part of the seasonal diversity transaction, and
  - (c) the price and resulting revenue or cost.



TERMS AND CONDITIONS OF EXPORT LICENCE

LICENCE REQUEST C - INTERRUPTIBLE ENERGY

1. The term of this licence shall commence on the 1st day of May, 1981, and shall end on the 30th day of April, 2001.
2. The classes of inter-utility export transfer authorized hereunder are sale, equichange, storage, carrier and adjustment transfers of interruptible energy.
3. The quantity of energy that may be exported hereunder, when combined with the amounts exported during the same period under the licence to be issued pursuant to Licence Request D of this application, shall not exceed 876 GW.h in any consecutive 12-month period.
4. The Licensee shall not export energy hereunder unless it is surplus to the firm energy requirements of economically accessible Canadian markets at the time it is exported.
5. The Licensee shall interrupt or curtail the delivery of energy hereunder whenever and to whatever extent such energy is required to supply,
  - (a) any firm load within Canada, or
  - (b) any Canadian electrical utility willing to buy part or all of the energy at the same price as that of the export, adjusted for any differences in the cost of delivery.

6. The price to be charged by the Licensee for energy exported hereunder as a sale transfer shall be no less than the price set forth in the applicable Service Schedule attached to the Interconnection and Transaction Agreement dated the 13th day of April, 1978, as amended on the 19th day of February, 1979, between the Licensee and Basin Electric Power Cooperative.
7. The Licensee shall not, without the prior approval of the Board, amend, enter into any agreement in substitution for or in addition to, or terminate the agreement referred to in Condition 6.
8. The Licensee, within fifteen days after the end of each month comprised in the term of this licence, shall file with the Board a report in such form and detail as the Board may specify, setting forth for each such month
  - (a) the quantity of energy exported hereunder, classified as to type of transfer,
  - (b) the price and resulting revenue for energy of each type,
  - (c) the quantity of energy imported as a part of an interruptible transaction from any utility in the United States of America,
  - (d) the current month-end balance in each energy exchange account maintained by the Licensee with a utility in the United States of America.

TERMS AND CONDITIONS OF EXPORT LICENCE

LICENCE REQUEST D - SHORT-TERM FIRM POWER

1. The term of this licence shall commence on the 1st day of May, 1981, and shall end on the 30th day of April 2001.
2. The classes of inter-utility export transfer authorized hereunder are sale and equichange transfers of short-term firm capacity and energy.
3. The total quantity of capacity that may be exported hereunder shall not at any time exceed the lesser of
  - (a) 150 megawatts, or
  - (b) the capacity that is surplus to the maximum foreseeable requirements of the Licensee's system after allowing for maintenance and required reserve.
4. (1) The quantity of energy that may be exported in any period within the term of this licence commencing on the 1st day of May of one year and ending on the 30th day of April of the next year ("operating year") shall not exceed the lesser of
  - (a) 876 GW.h less actual exports under the licence to be issued pursuant to Licence Request C of this application, or
  - (b) 65 per cent of the energy surplus determined in accordance with subconditions (2) and (3).

- (2) The Licensee, on or before the 31st day of March in each year comprised in the term of this licence, shall submit to the Board for its approval, an estimate, in such detail as the Board may specify, of the supply, demand and surplus of capacity and energy on its power system for each month of the next succeeding operating year.
- (3) The estimate described in subcondition (2) shall, if approved by the Board, constitute the energy surplus for such operating year for the purposes of subcondition 4(1) (b).
5. The price to be charged by the Licensee for capacity and energy to be exported hereunder as a sale transfer shall be no less than the price set forth in Service Schedule I of the Interconnection and Transaction Agreement dated the 13th day of April, 1978 as amended on the 19th day of February, 1979, between the Licensee and Basin Electric Power Cooperative.
6. The Licensee shall not, without the prior approval of Board, amend, enter into any agreement in substitution for or in addition to, or terminate the agreement referred to in Condition 5.
7. The Licensee shall not commit for export hereunder any block of capacity or energy for a period that exceeds six months.

8. The Licensee, before committing any block of capacity or energy for export hereunder shall first offer such capacity or energy to all economically accessible interconnected Canadian electrical utilities on terms not less favourable to a purchaser, after appropriate adjustments for any differences in the cost of delivery, than those on which the export would be made.
9. The Licensee, within 15 days after the end of each month comprised in the term of the licence, shall file with the Board a report in such form and detail as the Board may specify, setting forth for each such month,
  - (a) the quantities of capacity and energy exported hereunder,
  - (b) the price and resulting revenue.



TERMS AND CONDITIONS OF CERTIFICATE FOR  
THE 230 KV INTERNATIONAL POWER LINE

1. The international power line to be constructed pursuant to this certificate shall be owned and operated by Saskatchewan Power Corporation.
2. The international power line shall extend from the Boundary Dam switching station of Saskatchewan Power to a point located in the centre of the south boundary of Section Four, in Township One, in Range Eight, West of the Second Meridian in the Province of Saskatchewan.
3. The route of the international power line shall be as described in the Overview Report for the Boundary Dam to U.S. Border 230 kV Transmission Line dated May 1978 which formed a part of the application.
4. The total length of the power line shall be approximately 15.2 kilometres.
5. The international power line shall have one three-phase circuit insulated for 230 kV, 60 hertz operation using conductors no smaller than 954,000 circular mil ACSR.
6. The international power line shall meet Canadian Standards Association Standard C22.3, No. 1 - 1976, "Overhead Systems and Underground Systems".

7. Saskatchewan Power shall file a description and diagram of the metering facilities proposed in association with the international power line for the approval of the Board, which approval shall be obtained before the metering facilities are installed.
8. Saskatchewan Power shall file by the 1st day of May 1981 a description and diagram of the terminal facilities to be used in association with the international power line.
9. Saskatchewan Power shall not make any changes in the international power line or in the terminal facilities of the said line at Boundary Dam switching station or in the metering facilities without the prior approval of the Board.
10. Saskatchewan Power shall implement or cause to be implemented both during and after the construction of the international power line the recommendations and practices for the protection of the environment as adduced in evidence before the Board.
11. If the international power line has not been placed in service by the 1st of May 1982, this certificate shall expire on that date or upon such later date as may upon application be fixed by the Board.



